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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,125	02/19/2004	Ian Faye	2888	5226

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EXAMINER	
ONEILL, KARIE AMBER	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/782,125	FAYE ET AL.	
	Examiner	Art Unit	
	Karie O'Neill	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 8-17* is/are pending in the application.

4a) Of the above claim(s) *14-16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,8-13 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 22, 2207, has been entered.

Claim 1 has been amended. Claims 6-7 have been cancelled. Claims 14-16 have been withdrawn from consideration. Claim 17 has been added as new. Therefore, Claims 1-5, 8-13 and 17 are pending in this office action.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) or (f), which papers have been placed of record in the file.

Information Disclosure Statement

3. No information disclosure statement (IDS) has been filed. Applicant is reminded of their duty to disclose information that is material to the patentability of the instant application.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4, 8-10 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yi et al. (US 6,586,123 B1) in view of Kirby (US 6,716,550 B1).

With regard to Claim 1, Yi et al. discloses in Figure 1, a fuel cell device, comprising a fuel cell unit (10) including at least two fuel cells (12), which are electrically connected in series and referred to as a cell stack assembly (column 3 lines 4-7) and an electronic control unit or system controller (46) for controlling individual fuel cells of said fuel cell unit and having improved characteristics rendering them suitable for use in vehicles (column 1 lines 61-63). Yi et al. discloses the fuel cells are provided with catalytic layers or coatings (column 3 lines 62-65), but do not disclose the type or amount of catalyst being used. Yi et al. do not discloses wherein a first of said at least two fuel cells is provided with first catalytic coatings and wherein a second of at least two fuel cells is provided with second catalytic coatings different from said first catalytic coatings, and wherein said at least two fuel cells have at least different quantities of the catalytic coatings.

Kirby discloses a fuel cell stack comprising at least two fuel cells having an anode layer and a cathode layer comprising different catalytic compositions. The first

fuel cell of the stack is provided with a first catalytic coating on either the anode or the cathode and the second fuel cell of the fuel cell stack is provided with a second catalytic coating on either the cathode or the anode. The electrocatalyst in the catalyst layers may be a metal black, an alloy or a supported metal-based catalyst, for example platinum or carbon particles. The anode catalyst layer and the cathode catalyst layer typically comprise different catalytic compositions, such as, different catalysts and/or different amounts of catalyst on each of the anode and cathode layers (column 3 lines 26-29). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use different catalytic coatings and different quantities of catalyst in the fuel cell of Yi et al., because Kirby teaches different catalytic reactions occurring during operation of the fuel cell at the anode and the cathode, which would require different catalysts and different quantities of the catalysts (column 3 lines 32-37). It is also known in that art that when the composition of catalyst materials on the anode and/or cathode of a first fuel cell are different than the catalyst coatings on the anode and/or cathode of a second fuel cell, the two fuel cells are compositionally different, even if the difference is minor and occurs on only the anode, only the cathode or both the anode and the cathode. Absent unexpected results, the use of different catalytic coatings, both in type and quantity, in first and second fuel cells, would be obvious.

With regard to Claims 2-4, Yi et al. discloses the electronic control unit (46) including at least one control element for controlling material streams of individual ones of fuel cells, primarily the control element being formed as a control valve (34) operable to regulate the pressure of the fuel reactant as it enters the anode. It is the position of

the examiner that the control element being arranged between two of said fuel cells, is inherent, given that the control elements disclosed by Yi et al. and the instant application have the same material properties. A reference that is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. See MPEP 2112.

With regard to Claims 8-9, Yi et al. discloses at least one pressure generating unit for generating at least two different operational pressures. The pump or blower (32) used to pressurize air oxidant is variable and connected with the controller (46). The pump (30) establishes a predetermined coolant water pressure in the coolant stream. The reactant gas streams typically have a greater pressure than the coolant gas stream (column 4 lines 4-12).

With regard to Claim 10, Yi et al. discloses wherein the fuel cell unit is formed to provide an operation for supplying current (column 5 lines 1-17).

With regard to Claims 12 and 13, Yi et al. discloses in Figure 1, a fuel cell device, comprising a fuel cell unit (10) including at least two fuel cells (12), which are electrically connected in series and referred to as a cell stack assembly (column 3 lines 4-7) and an electronic control unit or system controller (46) for controlling individual fuel cells of said fuel cell unit and having improved characteristics rendering them suitable for use in vehicles (column 1 lines 61-63).

6. Claims 1-4, 8-10 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yi et al. (US 6,586,123 B1) in view of Haridoss et al. (US 2003/0031916 A1).

With regard to Claim 1, Yi et al. discloses in Figure 1, a fuel cell device, comprising a fuel cell unit (10) including at least two fuel cells (12), which are electrically connected in series and referred to as a cell stack assembly (column 3 lines 4-7) and an electronic control unit or system controller (46) for controlling individual fuel cells of said fuel cell unit and having improved characteristics rendering them suitable for use in vehicles (column 1 lines 61-63). Yi et al. discloses the fuel cells are provided with catalytic layers or coatings (column 3 lines 62-65), but do not disclose the type or amount of catalyst being used. Yi et al. do not discloses wherein a first of said at least two fuel cells is provided with first catalytic coatings and wherein a second of at least two fuel cells is provided with second catalytic coatings different from said first catalytic coatings, and wherein said at least two fuel cells have at least different quantities of the catalytic coatings.

Haridoss et al. discloses a plurality of fuel cells (35) arranged in series to form a fuel cell stack (30). Haridoss et al. also discloses the electrode composition including between about 75-95% wt % catalyst with non-electrolytic material making up the balance (paragraph 0031). The catalyst can be selected from a group consisting of platinum, ruthenium, iridium, rhodium, palladium, molybdenum and alloys thereof. The catalyst can be distributed on a first material with a load between about 5 percent and about 95 percent (paragraph 0032). Therefore, at the time of the invention it would

have been obvious to one of ordinary skill in the art to use different catalytic coatings and different quantities of catalyst in the fuel cell of Yi et al., because Hairdoss et al. teaches using different types catalyst to enhance catalytic activity and using differing amounts of catalyst so that if the catalytic activity of the catalyst is reduced by oxidation and/or passivation, then the catalyst can be re-activated or regenerated by reducing the catalyst (paragraph 0046). It is also known in that art that when the composition of catalyst materials on the anode and/or cathode of a first fuel cell are different than the catalyst coatings on the anode and/or cathode of a second fuel cell, the two fuel cells are compositionally different, even if the difference is minor and occurs on only the anode, only the cathode or both the anode and the cathode. Absent unexpected results, the use of different catalytic coatings, both in type and quantity, in first and second fuel cells, would be obvious.

With regard to Claims 2-4, Yi et al. discloses the electronic control unit (46) including at least one control element for controlling material streams of individual ones of fuel cells, primarily the control element being formed as a control valve (34) operable to regulate the pressure of the fuel reactant as it enters the anode. It is the position of the examiner that the control element being arranged between two of said fuel cells, is inherent, given that the control elements disclosed by Yi et al. and the instant application have the same material properties. A reference that is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. See MPEP 2112.

With regard to Claims 8-9, Yi et al. discloses at least one pressure generating unit for generating at least two different operational pressures. The pump or blower (32) used to pressurize air oxidant is variable and connected with the controller (46). The pump (30) establishes a predetermined coolant water pressure in the coolant stream. The reactant gas streams typically have a greater pressure than the coolant gas stream (column 4 lines 4-12).

With regard to Claim 10, Yi et al. discloses wherein the fuel cell unit is formed to provide an operation for supplying current (column 5 lines 1-17).

With regard to Claims 12 and 13, Yi et al. discloses in Figure 1, a fuel cell device, comprising a fuel cell unit (10) including at least two fuel cells (12), which are electrically connected in series and referred to as a cell stack assembly (column 3 lines 4-7) and an electronic control unit or system controller (46) for controlling individual fuel cells of said fuel cell unit and having improved characteristics rendering them suitable for use in vehicles (column 1 lines 61-63).

7. Claims 5, 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yi et al. (US 6,586,123 B1) in view of Kirby (US 6,716,550 B1), as applied to Claims 1-4, 8-10 and 12-13 above, and in further view of Menon et al. (US 2004/0146758 A1).

With regard to Claims 5 and 11, Yi et al. and Kirby disclose the fuel cell device in paragraph 5 above, but do not disclose wherein at least two of said fuel cells are

provided with different maximum electrical powers and wherein said fuel cell unit is formed so as to provide an operation for supplying heat.

Menon et al. discloses a fuel cell device wherein at least two of said fuel cells are provided with different electrical powers, the secondary fuel cell (40) is designed to operate differently from the primary fuel cell (22), for example, having different efficiencies or maximum powers (paragraph 0022), and wherein the fuel cell unit is formed so as to provide an operation for supplying heat as is provided by all exothermic reactions. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use two fuel cells arranged to provide different electrical powers and for supplying heat with the stack assembly of Yi et al. and Kirby, because Menon et al. teaches the use of the primary cell to provide the primary electrical load and the secondary cell provides a lower power to a load which requires less operating power (paragraph 0022) and converting anode effluent into heat that can be used in other parts of the stack (paragraph 0005).

With regard to Claim 17, Yi et al. discloses in Figure 1, a fuel cell device, comprising a fuel cell unit (10) including at least two fuel cells (12), which are electrically connected in series and referred to as a cell stack assembly (column 3 lines 4-7) and an electronic control unit or system controller (46) for controlling individual fuel cells of said fuel cell unit and having improved characteristics rendering them suitable for use in vehicles (column 1 lines 61-63). Yi et al. discloses the fuel cells are provided with catalytic layers or coatings (column 3 lines 62-65), but do not disclose the type or amount of catalyst being used. Yi et al. does not discloses wherein a first of said at least

two fuel cells is provided with first catalytic coatings and wherein a second of at least two fuel cells is provided with second catalytic coatings different from said first catalytic coatings, and wherein said at least two fuel cells have at least different quantities of the catalytic coatings.

Kirby discloses a fuel cell stack comprising at least two fuel cells having an anode layer and a cathode layer comprising different catalytic compositions. The first fuel cell of the stack is provided with a first catalytic coating on either the anode or the cathode and the second fuel cell of the fuel cell stack is provided with a second catalytic coating on either the cathode or the anode. The electrocatalyst in the catalyst layers may be a metal black, an alloy or a supported metal-based catalyst, for example platinum or carbon particles. The anode catalyst layer and the cathode catalyst layer typically comprise different catalytic compositions, such as, different catalysts and/or different amounts of catalyst on each of the anode and cathode layers (column 3 lines 26-29). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use different catalytic coatings and different quantities of catalyst in the fuel cell of Yi et al., because Kirby teaches different catalytic reactions occurring during operation of the fuel cell at the anode and the cathode, which would require different catalysts and different quantities of the catalysts (column 3 lines 32-37). It is also known in that art that when the composition of catalyst materials on the anode and/or cathode of a first fuel cell are different than the catalyst coatings on the anode and/or cathode of a second fuel cell, the two fuel cells are compositionally different, even if the difference is minor and occurs on only the anode, only the cathode or both

the anode and the cathode. Absent unexpected results, the use of different catalytic coatings, both in type and quantity, in first and second fuel cells, would be obvious.

Neither Yi et al. nor Kirby discloses wherein the quantities of the catalytic coatings are adapted to different loads or operational conditions, so that one of said at least two fuel cells which is operated relatively frequently is provided with a greater quantity of the catalytic coatings, while the other of said at least two fuel cells which is operated relatively seldom is provided with a smaller quantity of the catalytic coatings.

Menon et al. discloses a fuel cell device wherein at least two of said fuel cells are provided with different electrical powers, the secondary fuel cell (40) is designed to operate differently from the primary fuel cell (22), for example, having different efficiencies or maximum powers (paragraph 0022), and wherein the fuel cell unit is formed so as to provide an operation for supplying heat as is provided by all exothermic reactions. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use two fuel cells arranged to provide different electrical loads or operational conditions with the stack assembly of Yi et al. and Kirby, because Menon et al. teaches the use of the primary cell to provide the primary electrical load and the secondary cell provides a lower power to a load which requires less operating power (paragraph 0022). Absent unexpected results, it would be obvious that the primary cell providing a primary load would contain more catalytic coating and the secondary cell which provides a lower electrical load would contain less catalytic coating.

8. Claims 5, 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yi et al. (US 6,586,123 B1) in view of Haridoss et al. (US 2003/0031916 A1), as applied to Claims 1-4, 8-10 and 12-13 above, and in further view of Menon et al. (US 2004/0146758 A1).

With regard to Claims 5 and 11, Yi et al. and Haridoss et al. disclose the fuel cell device in paragraph 6 above, but do not disclose wherein at least two of said fuel cells are provided with different maximum electrical powers and wherein said fuel cell unit is formed so as to provide an operation for supplying heat.

Menon et al. discloses a fuel cell device wherein at least two of said fuel cells are provided with different electrical powers, the secondary fuel cell (40) is designed to operate differently from the primary fuel cell (22), for example, having different efficiencies or maximum powers (paragraph 0022), and wherein the fuel cell unit is formed so as to provide an operation for supplying heat as is provided by all exothermic reactions. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use two fuel cells arranged to provide different electrical powers and for supplying heat with the stack assembly of Yi et al. and Haridoss et al., because Menon et al. teaches the use of the primary cell to provide the primary electrical load and the secondary cell provides a lower power to a load which requires less operating power (paragraph 0022) and converting anode effluent into heat that can be used in other parts of the stack (paragraph 0005).

With regard to Claim 17, Yi et al. discloses in Figure 1, a fuel cell device, comprising a fuel cell unit (10) including at least two fuel cells (12), which are electrically

connected in series and referred to as a cell stack assembly (column 3 lines 4-7) and an electronic control unit or system controller (46) for controlling individual fuel cells of said fuel cell unit and having improved characteristics rendering them suitable for use in vehicles (column 1 lines 61-63). Yi et al. discloses the fuel cells are provided with catalytic layers or coatings (column 3 lines 62-65), but do not disclose the type or amount of catalyst being used. Yi et al. do not discloses wherein a first of said at least two fuel cells is provided with first catalytic coatings and wherein a second of at least two fuel cells is provided with second catalytic coatings different from said first catalytic coatings, and wherein said at least two fuel cells have at least different quantities of the catalytic coatings.

Haridoss et al. discloses a plurality of fuel cells (35) arranged in series to form a fuel cell stack (30). Haridoss et al. also discloses the electrode composition including between about 75-95% wt % catalyst with non-electrolytic material making up the balance (paragraph 0031). The catalyst can be selected from a group consisting of platinum, ruthenium, iridium, rhodium, palladium, molybdenum and alloys thereof. The catalyst can be distributed on a first material with a load between about 5 percent and about 95 percent (paragraph 0032). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use different catalytic coatings and different quantities of catalyst in the fuel cell of Yi et al., because Hairdoss et al. teaches using different types catalyst to enhance catalytic activity and using differing amounts of catalyst so that if the catalytic activity of the catalyst is reduced by oxidation and/or passivation, then the catalyst can be re-activated or regenerated by reducing the

catalyst (paragraph 0046). It is also known in that art that when the composition of catalyst materials on the anode and/or cathode of a first fuel cell are different than the catalyst coatings on the anode and/or cathode of a second fuel cell, the two fuel cells are compositionally different, even if the difference is minor and occurs on only the anode, only the cathode or both the anode and the cathode. Absent unexpected results, the use of different catalytic coatings, both in type and quantity, in first and second fuel cells, would be obvious.

Neither Yi et al. nor Haridoss et al. discloses wherein the quantities of the catalytic coatings are adapted to different loads or operational conditions, so that one of said at least two fuel cells which is operated relatively frequently is provided with a greater quantity of the catalytic coatings, while the other of said at least two fuel cells which is operated relatively seldom is provided with a smaller quantity of the catalytic coatings.

Menon et al. discloses a fuel cell device wherein at least two of said fuel cells are provided with different electrical powers, the secondary fuel cell (40) is designed to operate differently from the primary fuel cell (22), for example, having different efficiencies or maximum powers (paragraph 0022), and wherein the fuel cell unit is formed so as to provide an operation for supplying heat as is provided by all exothermic reactions. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use two fuel cells arranged to provide different electrical loads or operational conditions with the stack assembly of Yi et al. and Haridoss et al., because Menon et al. teaches the use of the primary cell to provide the primary

electrical load and the secondary cell provides a lower power to a load which requires less operating power (paragraph 0022). Absent unexpected results, it would be obvious that the primary cell providing a primary load would contain more catalytic coating and the secondary cell which provides a lower electrical load would contain less catalytic coating.

Response to Arguments

9. Applicant's arguments filed October 22, 2007, have been fully considered but they are not persuasive.

Applicant's principal arguments are:

(a) Claims 1 defines that the quantity of the coating of the one of the cells is different from the quantity of the coatings of the other cell. The term "coatings" clearly means that in the first cell there are coatings of the anode and of the cathode, and the second cell there are coatings of the anode and of the cathode, and in the quantities of the coatings of the anode and cathode of one cell are different from the quantities of the anode and cathode of the other cell, correspondingly. This has nothing to do with two cells in which the quantity of the catalytic coating of the anode is different from the quantity of the catalytic coating of the cathode in two different cells.

In response to Applicant's arguments, please consider the following comments:

(a) The prior art reads on the claim when giving it the broadest interpretation possible. Kirby discloses that due to different catalytic reactions occurring during operation of the fuel cell at the anode as compared to the cathode, the anode

catalyst and the cathode catalyst typically comprise different catalytic compositions including different types of catalyst and/or different amounts of catalyst. This means that the total amount of catalyst in each cell, i.e. the amount of anode catalyst added to amount of cathode catalyst, can be different in each fuel cell unit. Haridoss et al. discloses the electrode composition can include between about 75-95 wt % of catalyst material. Therefore, each fuel cell unit can have different quantities of anode catalyst and cathode catalyst, making the total amount of catalyst present in the unit different in each fuel cell unit depending on the desired operational conditions the fuel cell unit is to provide.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571) 272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karie O'Neill
Examiner
Art Unit 1795

KAO

MARK RUTHKOSKY
PRIMARY EXAMINER

1.4.2008